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Development of Masking Learning Module for Vocational High School Automotive Body Engineering Expertise Competency

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ABSTRACT

The purpose of this research is to produce a learning module that is feasible for learning to carry out masking on unrepaired vehicle body parts. The data collection technique in this study is using a student response questionnaire using a Likert scale. This type of research is research and development (R&D) using the 4-D research model. The subjects of this research were XI TBR class students at SMK Kristen 5 Klaten, totaling 30 students. Data analysis using percentage techniques. The results showed that based on the results of the assessment by material experts, media experts, and trials to students, the learning module developed was feasible for use in learning. The assessment of the feasibility of learning modules by material experts received a score of 75% with feasible criteria, the assessment of media experts received a score of 75% with feasible criteria and the results of trials to students as users received a score of 86% with a very feasible category. Therefore, this module can be used in learning to carry out masking on unrepaired vehicle body parts for students of Light Vehicle Body Engineering.

Keywords: Body Parts, Development, Masking, Module

INTRODUCTION

The rapid advancement of technology and information demands highly competent human resources. Therefore, Vocational High Schools (SMK) as part of vocational education at the secondary level are required to be able to produce graduates as competent prospective workers in accordance with their vocational fields. To produce graduates who are ready to work, SMK must equip their students with knowledge and skills that are in accordance with the expertise competencies studied [1]. Therefore, the quality of learning in SMK must always be improved and adjusted to the demands of the world of work and technological advances [2].

High student learning outcomes, teacher facilitation, student-centred learning and student engagement are some of the indicators of good learning quality. Learning quality is also influenced by learning motivation and interest in the subject [3]. Learning is a process carried out by teachers to change students' knowledge, attitudes, abilities, and skills [4]. Learning is the process of changing the behaviour of a person or other people through interaction with the environment, and the process can be carried out informally, formally, and non-formally [5], [6].

SMK Kristen 5 Klaten is one of the vocational schools that offers expertise in body repair engineering. The purpose of this institution is to produce the best graduates who are ready to work or open a business, especially in the field of vehicle body repair. To prepare graduates who are ready to work, in the Body Repair Engineering curriculum there is an automotive body painting subject with material on masking procedures for spot repainting repairs given in class XI semester 2. In practice, when delivering theoretical material, teachers still use the lecture method a lot. It was also found that the media used in learning the theory of automotive body painting was in the form of textbooks, blackboards and assignment sheets.

This causes students to be less than optimal in absorbing the material provided by the teacher. The textbooks used in learning are printed books that contain a lot of text without any pictures and an unattractive appearance. The number of books is also limited and not owned by students, so students have difficulty repeating learning independently both at home and at school.

With these learning conditions, the quality of learning automotive body painting is not optimal. This is evident from the results of the final assessment of even semester students in the 2021/2022 academic year. Of the 30 students, only 6 students scored at or above the Minimum Completion Criteria. With these conditions, the teacher finally had to provide remedial in the form of assignments without being able to return to how the students' mastery of competence.

From the results of interviews with several students, it is known that they find it difficult to learn vehicle body painting

competencies. With learning using the lecture method, students feel bored quickly and cannot concentrate on the subject matter delivered by the teacher. Students also stated that due to the limitations of textbooks and with limited learning time and a lot of learning material, students had difficulty in recording learning material. The existing textbooks also cannot be taken home by students. With these conditions, students cannot repeat/relearn the lesson material provided. From observations and interviews with teachers and students, it is known that almost all students of SMK Kristen 5 have gadgets that can be used to read electronic books in PDF format.

With these conditions, this research aims to improve the quality of learning vehicle body painting with teaching materials to carry out masking on unrepaired body parts. This research seeks to create a learning module that can be accessed independently by students using their respective gadgets. With the module, it can be used as learning media in the form of printed books or electronic books (files in pdf format), because learning media can be in the form of hardware and software [7].

Learning media is anything that can be used to channel messages (learning materials) so that there is educational interaction between student teachers and teaching materials[8][9][10]. This interaction can take the form of attention, interest, thoughts, and feelings, and can also attract students‘ attention so that it can focus students’ attention to always focus on learning activities in order to meet learning objectives [11]. Learning media has the ability to communicate educational messages [12]. With this ability, the media will be able to help students assimilate the material better and develop a desire to learn both independently and together with their peers, thus fostering the same understanding [13][14][15].

Module as an independent learning media is defined as a collection of learning materials that are systematically arranged in accordance with a special curriculum, packaged as the smallest learning unit, and allows independent study at a predetermined time [16]. As teaching materials, modules must be packaged systematically and intact. Module is an organised group of learning experiences intended to assist students in mastering learning materials and conducting independent evaluations [17].

Learning modules can help students become more independent learners. An active learning process is needed to encourage and inspire students to actively participate in their education, thus giving them many opportunities to be creative based on their personal interests and abilities. This is necessary so that the student learning process can be completed [18]. Increasing students' creativity and talent is expected to achieve the expected goals. The learning process must be planned to achieve the desired learning objectives or high-quality

results [19]. Rabiman revealed that to improve student learning outcomes in the future, learning media is needed that can attract interest and motivate learners to participate in the learning stage [10]. One type of media that can be used to improve independence and learning outcomes is a module, which is an instructional information bundled in an organised manner [8]. Module as a complete unit can stand alone and consists of a number of instructional activities intended to assist students in achieving a number of learning objectives formulated in detail and in detail [20].

Some of the advantages of learning modules include: (1) it can provide feedback, (2) it has clear and straightforward learning objectives, (3) it is designed to be attractive so that it makes it easier to learn and increase learning motivation, (4) it is flexible, (5) cooperation can be established easily, (6) remediation can be done easily . Quality learning modules can be used to improve learning outcomes. To create a quality learning module must pay attention to various characteristics [21].

The characteristics of the learning module include: (1) The principle of goal-oriented learning design (objective model), (2) Self-instructional, (3) Adaptive, (4) The principle of self-learning, (5) The principle of continuous progress, (6) The principle of structuring material in a modular manner that is complete and intact (self contained), (7) The principle of cross-referencing between learning modules in the course (cross referencing), (8) Assessment of individual and independent learning abilities on student learning progress (self-evaluation), (9) Friendly or familiar (User Friendly)[17]. Electronic modules (e-modules) that can be inserted with various links to learning videos and other sources can help increase students' enthusiasm in learning [22]. The use of android-based learning media can help teachers in delivering material to students so that learning becomes more interesting, efficient, and effective and can add insight to students. [23].

Besides reading, students are believed to understand lab procedures more easily if they are exposed to instructional videos during or before carrying out lab activities [24]. The use of on-line videos makes it easier for students to learn. Video-based learning on YouTube makes it easier for students to understand concepts and facts [25]. Therefore, the teaching module developed in this study will insert appropriate learning video links.

RESEARCH METHOD

This research uses research and development. Development research is a basic experimental activity to obtain information on needs for users (need assessment), and continued development activities (development) with the final product. Development research is a way for researchers to test and develop or create new ones [26].

This study used the 4-D development model by Thiagarajan (1974). There are four phases in the development process: defining, designing, developing, and disseminating. The dissemination procedure in this study was conducted in a small class [27].

The data analysis technique used in this research is quantitative descriptive analysis technique. A way to describe the information collected without drawing conclusions that apply to the general public with qualitative and quantitative data. Qualitative data uses a Likert scale with a score of 1 to 4. The Likert scale was chosen to measure a person's opinion and perception. Quantitative data is obtained from qualitative data obtained from descriptions, which are converted into numbers according to the following table;

Table. 1. Assessment score

Valuation	Description	Score
SS	Strongly Agree	4
S	Agree	3
KS	Less Agree	2
TS	Disagree	1

The steps to analyze the data in developing this module are as follows:
Calculate the average using the formula:

$$xx = \frac{\sum xx}{nn}$$

Description: xx : Average score
∑xx : Sum of scores
nn : Number of grades

The average percentage of module feasibility can be calculated on the total instrument score according to Suharmi Arikunto [28]

$$\% = \frac{The\ score\ obtained}{The\ ideal\ number\ of\ scores}\ x\ 100\%$$

Table. 2. Module feasibility criteria

Score	Criteria
x > 75%	Very Feasible
75%≤ x ≤ 62,5%	Feasible
62,5%< x ≤ 50 %	Less Feasible
x < 50%	Not Feasible

After the feasibility percentage is obtained, it is then consulted with the table 2.

RESULT AND DISCUSSION

The learning module Carrying out Masking on Unrepaired Body Parts in this study was developed referring to the 4-D development model research with 4 stages, namely the define, design, develop, and disseminate stages as shown in Figure 1.

Define

The define stage is the needs analysis stage which will be used as the basis for analysing and collecting information. The needs analysis carried out by researchers includes: curriculum analysis, analysis of learner characteristics, material analysis and formulate learning objectives. Data collection was carried out by interviewing the vehicle body painting teacher and class XI students as potential users.

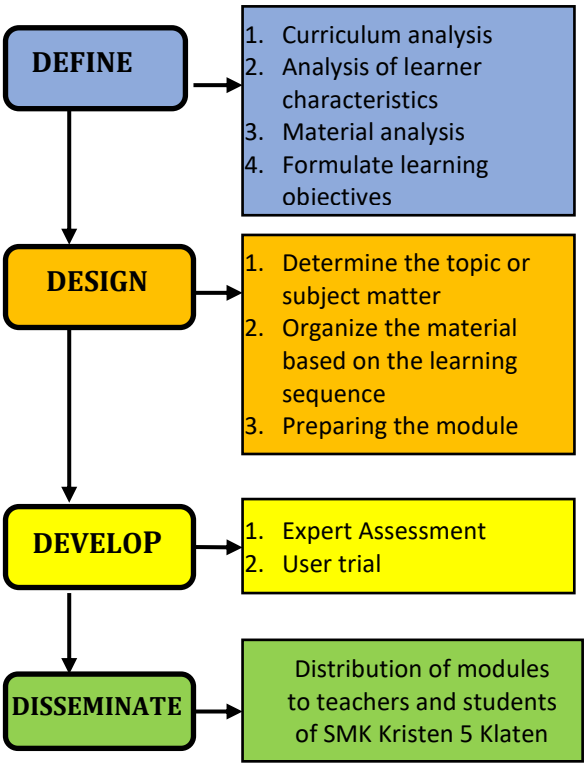

Figure 1. The 4D-development procedure

Design

The design stage is a process to produce a draft design of the module to be developed. In addition, the module is prototyped at the design stage until the module prototype is ready to be validated. This design stage begins with choosing the appropriate learning material topic, organizing the material according to the basic competence and the sequence of learning objectives, selecting the format and preparing the module script.

Develop

The develop stage is the process of finalising the product produced at the design stage to produce a product that is ready for widespread use. This development stage includes expert validation and field trials. Based on the results of the validation results of media experts, material experts and field trials, then revisions are made until the product is feasible and can be used as teaching material.

The final product of this development is a learning module to carry out masking on unrepaired body parts. This module covers the competency standards of carrying out masking on unrepaired body parts in automotive body painting subjects to determine the level of student understanding. This module is prepared based on initial analysis data. The design is made based on student needs, and the material is divided into modules based on basic competencies according to the curriculum of automotive body painting subjects.

Disseminate

The dissemination stage is the final stage of the development process, where the learning module that has been validated and tested to users is revised again based on input input until the module is suitable for use. The learning module to carry out masking on unrepaired body parts that are ready to use is then printed as many as 10 copies to be archived in the library and teacher's handbook and soft copies in the form of pdf files are handed over to teachers to be disseminated to students.

Feasibility Test by Material Expert

The feasibility test by material experts is carried out in order to know the feasibility of the learning module to carry out masking in terms of the subject matter packaged in the

module. As a material expert is a vehicle body painting teacher who has more than 15 years of teaching experience and has a bachelor's degree and has a professional teacher certificate. Feasibility assessment by material experts can be seen in table 3:

Table 3. Material expert assessment

No	Aspects	Item	Value	Pres	Categori
1	Appropriateness of the material	3	0,75	75%	Feasible
2	Material accuracy	8	0,75	75%	Feasible
3	Learning material support	6	0,75	75%	Feasible
4	Sophistication of the material	3	0,75	75%	Feasible

Based on the calculation of the percentage of module feasibility scores from material experts, a value of 75% is obtained, which means that the material in the learning module for masking unrepaired body parts is declared to be included in the feasible criteria for testing and use in learning.

Feasibility Test by Media Experts

The feasibility test by media experts is aimed at obtaining an assessment of whether the appearance of the Module made is sufficiently attractive to users and feasible to use in learning and ease of use. As a media expert is a lecturer in the vocational education program of Ust Mechanical Engineering with a master's educational background and has 6 years of teaching experience.

Tabel 4. Media expert assessment

Seq	Aspects	Item	Value	Presentage	Categori
1	Display	2	0,75	75%	Feasible
2	Cover	5	0,75	75%	Feasible
3	Font	3	0,75	75%	Feasible
4	Layout	5	0,75	75%	Feasible
5	Easy Of Use	5	0,75	75%	Feasible

Based on the calculation of the percentage of module feasibility scores from media experts, a value of 75% of each aspect is obtained, which means that the learning module for carrying out masking on unrepaired body parts for class XI even semester students is declared to be included in the Feasible criteria to be tested and used as teaching material for painting masking for class XI.

Feasibility Test by Students

The final testing stage of this development research is a limited trial to 30 class XI students at SMK Kristen 5 Klaten. The trial was conducted after improvements were made based on suggestions and input from media experts and material experts. The trial was conducted to obtain student responses as module users. The assessment carried out covers the utilisation aspect.

Table 5. Student assessment

Aspects	Score	Students	Value	Presentage
Feasibility	1096	30	0,86	86%
Eligibility criteria		**Very Feasible**		

The results of the student respondent questionnaire assessment above show that the learning module carries out masking on unrepaired body parts that are implemented

so as to get a very Feasible response from the overall module feasibility percentage score of 30 respondents is 86% which means that the learning module carries out masking on unrepaired body parts which are declared to be in the very Feasible category to be used as writing material.

Product Review

The final product of this research and development is the availability of a learning module to carry out masking on unrepaired body parts. Product development uses the 4-D model, with its stages namely; defining, designing, developing, and disseminating. The main target in using the learning module to carry out masking is class XI even semester students. The reason for choosing this target is because there is no learning module for masking used in the learning process. So the material that must be included in the learning module to carry out masking is:

a. General understanding of masking and Occupational Health and Safety (OHS) in the masking process.
b. Equipment, masking materials and types of masking
c. Masking procedures. for spot repair repainting.
d. Masking technique for spot repainting repair.

Figure 2. Cover of Module

The title of the module compiled is to carry out masking on body parts that are not repaired. The learning module material grid is generated from the process of preparing the draft module in the design stage. The outline of the draft module includes; Chapter I Introduction (contains a description of the module, prerequisites, module user instructions, final objectives, competencies, and ability checks), and chapters II-V which contain learning material divided into 4 topics of masking learning material and Chapter VI which contains final evaluation and closing.

https://youtu.be/4HXX2v7S0v0

Figure 3. QR code link to related learning video

Each learning material in Chapters II-V is composed of learning objectives, material descriptions, summaries, formative tests and formative test answer keys and QR codes or links from learning videos related to learning materials taken from YouTube channels. The existence of a QR Code or YouTube link to provide easy access to videos for students while learning.

Discussion

This research produces a module both printed and softcpy which is equipped with; preface, table of contents, list of pictures, list of tables, glossary, module seat map and content and cover. Module settings; A4 paper size, 1.5 spacing, 4 cm top margins, 4 cm left margins, 3 cm right margins, 3 cm bottom margins. Modules are structured using a commonly used format that makes it easy for users to access both using hardcopy and softcopy. [7][17].

The results showed that the percentage of feasibility of learning modules carrying out masking by material experts obtained a score of 75% with Feasible criteria. The results of the assessment of the percentage of module feasibility by media experts obtained a score of 75% with the Feasible category and the results of the assessment by students obtained a percentage of module feasibility of 86% with the Feasible category. So the results of this study prove that the Learning module carrying out masking on unrepaired body parts can help students in the teaching and learning stage so that they can achieve the learning objectives set [29].

The final product of this development is a learning module to carry out masking on unrepaired body parts. This module contains competency standards, namely carrying out masking on unrepaired body parts. This learning module contains 4 materials as learning activities, namely (1) general understanding of masking and K3 in the masking process, (2) equipment, masking materials and types of masking (3) masking procedures for spot repair repainting and (4) masking techniques. This module is also equipped with a formative test at the end of the learning process and a final evaluation in order to know the level of understanding of students. The module made is in accordance with Nasution's opinion which states that as a complete unit that can stand alone and consists of a number of instructional activities intended to assist students in achieving a number of learning objectives formulated in detail and detailed [20].

The resulting module is also very practical and efficient because the material that students learn and practice is very suitable. With the QR code and YouTube links to learning videos related to the material of each chapter, it is easy for students to access the learning videos needed quickly using Android or computer, because most students have Android connected to the internet. The use of video tutorials is very suitable,

practical and efficient to be implemented in practical activities in the classroom [22][30].

According to the assessment of students as users, the developed module has the characteristics of being effective, easy to understand, structured, systematic and easy to access. This study supports the findings of studies by Sudibyo and Rahdiyanta [31], who found that the use of online e-modules for learning has a number of benefits. These benefits include the ability to focus feedback so that students can measure their level of learning achievement; strong stimulation to learn thoroughly due to learning guided by e-module teaching materials; and flexible learning, namely learning that is tailored to the differences owned by students, including those related to learning speed and how to learn the subject matter.

CONCLUSION

Based on the results of research and discussion, it can be concluded: (1). By using Thiagarajan and Semmel's Four-D approach, the learning module for masking on unrepaired body parts was developed through the defining stage, design stage, development stage, and dissemination stage. 2) the learning module to carry out masking on unrepaired body parts developed Feasible to be used as learning material at SMK Kristen 5 Klaten. Validation results: media experts get a final score of 75% including the Feasible category; media experts get a final score of 75% including the Feasible category; and module feasibility assessments conducted by students (Users) get a score of 86% with the Feasible category. Thus, the learning module for masking can be used as teaching material at SMK Kristen 5 Klaten.

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